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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/639,288	08/15/2000	Ross Addinall	1/3-1/2	1572

27964 7590 07/30/2003

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EXAMINER

CAO, PHAT X

ART UNIT PAPER NUMBER

2814

DATE MAILED: 07/30/2003

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 13

Application Number: 09/639,288
Filing Date: August 15, 2000
Appellant(s): ADDINALL ET AL.

Charles W. Gaines
For Appellant

EXAMINER'S ANSWER

MAILED
JUL 30 2003
GROUP 2800

This is in response to the appeal brief filed 12/10/2002.

(1) *Real Party in Interest*

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A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

The brief states that there are no related appeals or interferences.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

However, the ground of rejection of claims 1-4 and 7-10 as being anticipated under 35 U.S.C. 102(e) by U.S. Patent 6,265,783 to Juso et al. is withdrawn to simplify the appeal issue.

(7) *Grouping of Claims*

Appellant's brief includes a statement that claims 1-7 stand or fall together, and claims 8-12 stand or fall together.

(8) *Claims Appealed*

A substantially correct copy of appealed claims 1-4 and 7-10 appears on pages 15-17 of the Appendix to the appellant's brief. The minor errors are as follows: claims 5-6 and 11-12 are not appealed claims because claims 11-12 are allowed and claims 5-6

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are indicated as being allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

(9) *Prior Art of Record*

US 5,641,946

Shim

24 Jun 1997

(10) *Grounds of Rejection*

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

I. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

II. Claims 1-3 and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Shim (US. 5,641,946).

Referring to Shim's Figs. 9A-9B (or Fig. 5A) and Fig. 11, if the center-to-center spacing between one of the top outermost pads 5 and the corresponding adjacent outermost pad 5 at the bottom is defined as the first spacing of the first set, and the spacing between the two adjacent innermost pads 5 is defined as the second spacing of the second set, then Shim disclose an integrated circuit die 1 including: first set of conductive pads d4 and second set of conductive pads (d1,d2,d3) for enabling external

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connections to be made to the integrated circuit, there being a first predetermined center-to-center spacing between each pad d4 of the first set and the corresponding single adjacent pad d4 of the first set (see Exhibit A which is attached to this Examiner's answer for clarification), and a second predetermined center-to-center spacing, less than the first spacing, between each pad of the second set and the adjacent pads of the first and second sets, and a passivation layer 6 exposing pads d4 of the first sets for connecting to the terminals B4 for flip-chip assembly of the die and exposing pads (d1,d2,d3) of the second sets for connecting to the terminals B1, B2, and B3 for wire bond assembly of the die; wherein the pads d4 of the first set are larger in area than the pads (d1,d2,d3) of the second set (column 4, lines 37-39 and column 5, lines 23-25).

Claim Rejections - 35 USC § 103

III. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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IV. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shim (US. 5,641,946).

Shim does not specifically disclose that the first set of pads is connected to one set of connection points and the second set of pads is connected to another set of connection points in the integrated circuit.

However, it would have been obvious to connect the first and second set of pads of Shim to the connection points as set forth above for the known purpose of providing the electrical contacts between the semiconductor die and the mother board.

(11) Response to Argument

ISSUE NO. 1: Whether claims 1-3 are anticipated under 35 U.S.C. 102(b) by U.S. Patent No. 5,641,946 to Shim.

A) Appellant argues (page 11 of Brief) that Shim fails to disclose « a passivation layer exposing only pads of the first set, or exposing pads of the first and second sets” because Shim discloses that the insulating layer 6 exposes pads of three or four sets of conductive pads of respective heights h1, h2, h3 and H (Fig. 11).

It appears Appellant argues that in Fig. 11, the set of conductive pads (d1,d2,d3) cannot be considered as “the second set” because they have different heights h1, h2 and h3. Appellant’s arguments are not persuasive because of the following reasons below:

- first, the feature of having each of the conductive pads of the second set

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having the same height is not required by the claim language. In the other words, the claim language is not limited to the conductive pads of the second set having the different heights;

- second, the Examiner believes that Appellant has inadvertently misinterpreted Shim's Fig. 11. Specifically, Shim's Fig. 11 discloses the heights h_1 , h_2 , h_3 and H are the heights of the solder balls, but not the heights of the conductive pads as asserted by Appellant;
- third, it should be noted that claims in a pending application should be given their broadest reasonable interpretation. In re Pearson, 494 F. 2d 1399, 181 USPQ 641 (CCPA 1974). In the Office Action (04 June 2002), the Examiner states:

"Shim, in Fig. 9A (or Fig. 5A) and Fig. 11, discloses an integrated circuit die 1 including **first set of conductive pads d4** and **second set of conductive pads (d1,d2,d3)** for enabling external connections to be made to the integrated circuit,...".

Therefore, there are only 2 sets of conductive pads, but not three or four sets of conductive pads as asserted by Appellant. Thus, Shim's Fig. 11 does suggest that the passivation layer 6 of insulating film exposes pads of first and second sets of conductive pads.

B) Appellant (page 11 of Brief) further argues that Shim's Figs. 5A and 11 does not suggest "there being at least a first predetermined center-to-center spacing between each pad of the first set and the adjacent pad or pads of the first set, and at least a second predetermined center-to-center spacing, less than said first spacing, between each pad of the second set and the adjacent pad or pads of the first and second

sets,...” because the outermost pads 5 of the first set have the same center-to-center spacing as the innermost pads 5 of the second set.

It should be noted that the claim language of claim 1 requires that the first center-to-center spacing of the first set is the spacing between each pad of the first set and **any corresponding single** adjacent pad of the first set, but does **not require** that the first center-to-center spacing of the first set must be the spacing between each pad of the first set and **all** corresponding adjacent pads of the first set. Therefore, Appellant's arguments are not persuasive because Shim clearly suggests the limitations as claimed. Specifically, referring to Exhibit A (copy of Shim's Figs. 5A and 11) which is attached to this Examiner's answer for clarification, if the center-to-center spacing between one of the **top outermost** pads 5 and the corresponding adjacent **outermost** pad 5 at the **bottom** is defined as the first spacing of the first set, and the spacing between the two adjacent innermost pads 5 is defined as the second spacing of the second set, then the spacing of the second set is clearly less than the first spacing of the first set because the innermost pads 5 are formed in the boundary of the **top** and **bottom** outermost pads 5.

C) Appellant (page 12 of Brief) further argues that Shim does not suggest the pads of the first set are larger than the pads of the second set.

This argument is not persuasive because Shim clearly states at column 4, lines 37-39:

“the outside lands 5 are designed to be larger than the inside lands 5 as shown in Fig. 5A.”

and at column 5, lines 23-25:

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"... the solder ball lands [pads] 5 of the circuit board 1 are designed to be gradually larger in the direction from the innermost land to the outermost lands as shown in the arrow of Fig. 9B."

Therefore, Shim's Figs. 5A and 9B clearly suggest that the pads of the first set are larger than the pads of the second set.

D) Regarding dependent claims 2-3, Appellant (page 13) argues that Shim is not an anticipating reference for dependent claims 2-3 because Shim does not disclose the subject matter set forth in their independent claim 1.

This argument is not persuasive because Shim does disclose all the subject matter set forth in independent claim 1. The discussions with respect to Shim above in conjunction with Issue No. 1, sections A-C are herein incorporated by reference.

ISSUE NO. 2: Whether claims 8-10 are anticipated under 35 U.S.C. 102(b) by U.S.

Patent No. 5,641,946 to Shim.

A) Regarding independent claim 8, Appellant (page 11 of Brief, second paragraph, and page 12, first paragraph) argues that Shim's Fig. 5A does not suggest "a first set of conductive pads having a first minimum distance therebetween; and a second set of conductive pads having a second minimum distance therebetween, and between a pad of the second set and a neighboring pad of the first set (claim 8)" because the outermost pads 5 of the first set have the same minimum distance as the innermost pads 5 of the second set.

These arguments are not persuasive because of the following reasons below:

- first, the feature of having the first minimum distance formed between the first

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set of pads different from the second minimum distance formed between the second set of pads is not required by the language recited in claim 8. in the other words, the language of claim 8 is not limited to have the first minimum distance of the first set of pads to be the same as the second minimum distance of the second set of pads;

- second, as discussed in Issue No. 1, Shim's Fig. 5A clearly discloses each pair of the second set of pads having a second distance which is larger than a first distance of each pair of the first set of pads. Specifically, referring to Exhibit A (copy of Shim's Figs. 5A and 11) which is attached to this Examiner's answer for clarification, if the center-to-center spacing between one of the top outermost pads 5 and the corresponding adjacent outermost pad 5 at the bottom is defined as the first spacing of the first set, and the spacing between the two adjacent innermost pads 5 is defined as the second spacing of the second set, then the spacing of the second set is clearly less than the first spacing of the first set because the innermost pads 5 are formed in the boundary of the top and bottom outermost pads 5.

Appellant (page 12 of Brief, second paragraph) further argues that Shim does not suggest the pads of the first set are larger than the pads of the second set.

This argument is not persuasive because Shim clearly states at column 4, lines 37-39:

"the outside lands 5 are designed to be larger than the inside lands 5 as shown in Fig. 5A."

and at column 5, lines 23-25:

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"... the solder ball lands [pads] 5 of the circuit board 1 are designed to be gradually larger in the direction from the innermost land to the outermost lands as shown in the arrow of Fig. 9B."

Therefore, Shim's Figs. 5A and 9B clearly suggest that the pads of the first set are larger than the pads of the second set.

B) Regarding dependent claims 9-10, Appellant (page 13 of Brief) argues that Shim is not anticipate reference for dependent claims 9-10 because Shim does not disclose the subject matter set forth in their independent claim 8.

This argument is not persuasive because Shim does disclose all the subject matter set forth in independent claim 8. the discussions with respect to Shim above in conjunction with Issue No. 2, Section A are herein incorporated by reference.

ISSUE NO. 3: Whether claim 7 is unpatentable under 35 U.S.C. 103(a) in view of Shim.

Appellant (page 13 of Brief) argues that dependent claim 7 is not obvious in view of Shim because Shim does not disclose the subject matter set forth in its dependent claim 1.

This argument is not persuasive because Shim does disclose all the subject matter set forth in independent claim 1. The discussions with respect to Shim above in conjunction with Issue No. 1, sections A-C are herein incorporated by reference.

For the above reasons, it is believed that the rejections should be sustained.

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Respectfully submitted,

PC
July 18, 2003

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EXHIBIT A

FIG. 5A

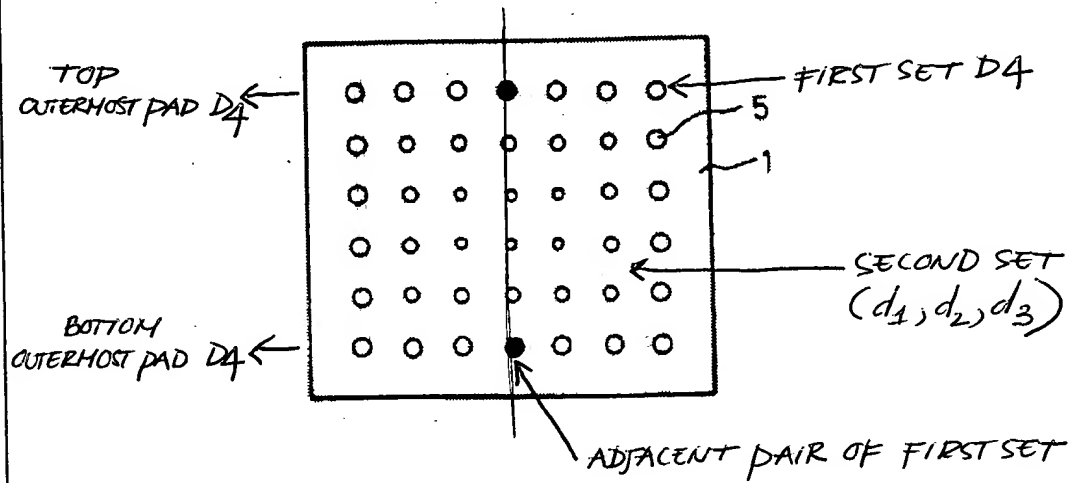


FIG. 11

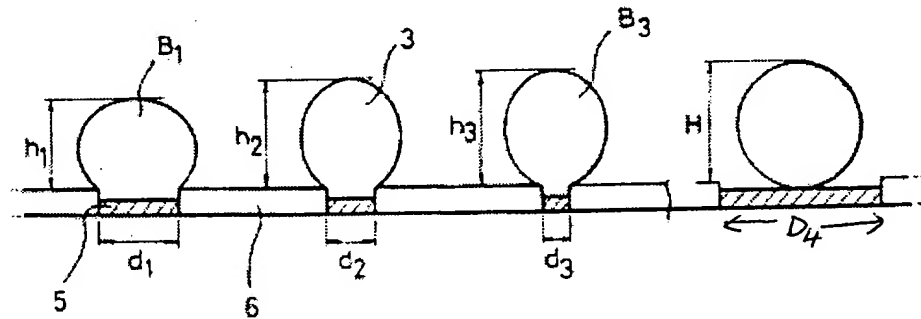


Illustration 2